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THE FIELD
OF
OCCULT CHEMISTRY

by

E. LESTER SMITH
and
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FOUR SHILLINGS AND SIXPENCE

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of
OCCULT CHEMISTRY

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"To understand what are the divine processes involved in construction,

to add that knowledge to the store of facts known as Theosophy and

to help Theosophists to understand better the Great Plan and be inspired by enthusiasm to further it."

C.J.

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All references to *Occult Chemistry* are to the third edition unless specially stated.

PREFACE TO SECOND EDITION

This transaction was first published in 1934 with the object of encouraging the study of Occult Chemistry by theosophists and scientists. It was not therefore presented as a comprehensive study of the subject but rather as an introduction in the sense of outlining the scope of this occult science and indicating how it might be studied by orthodox scientists and possibly enriched by occultists.

With the publication in 1951 of the third edition of *Occult Chemistry* we have thought it desirable to re-issue this transaction with such revision as time and the new edition have made necessary. The following review reprinted from *News and Notes*, May-June 1952, will give the reader an impression of the book on which this transaction is based.

"*OCCULT CHEMISTRY*. Annie Besant and C. W. Leadbeater, edited by C. Jinarajadasa, M.A., assisted by Elizabeth W. Preston, M.Sc., T. P. H. Adyar, 3rd Ed. 1951. £3 15s. od.

The publication of this book places on record the results of clairvoyant investigations, by two great occultists, into the atomic and molecular structure of our physical world. The investigations were carried out over a long period of time, 1895 to 1933: some of the results were published in the first edition of *Occult Chemistry* in 1908, some in *The Theosophist* over the period, while much, particularly that dealing with compounds, has never previously been published. Thus this 3rd and enlarged edition is very much more than just another edition: it is a well arranged and systematic description of the 'occultist's chemical atoms,' with an indication of their behaviour in forming compounds. The atoms are described and illustrated as patterns of groups of *ultimate physical atoms* or *anu* indicating that, by the repetition of similar groups in related elements, occult chemistry presents a self-consistent system.

Since the work is a posthumous publication of A.B., and C.W.L, the editor and assistant editor have wisely refrained from comment and, while arranging the material in orderly fashion, have endeavoured to present it in its original form, leaving to future students the critical examination and extension of the work.

Let it be admitted that there is no clear correlation between the scientist's idea of atomic structure and that of the occultist. The method of approach and the reason for investigation have been different. The scientist's chemical atom is largely a mathematical elaboration of phenomena observed by the five senses by means of elaborate physical instruments, and for practical application.

The occultist's view of the chemical atom is via supra-sensual observation and for philosophical purposes. Thus *Occult Chemistry* should be read as an approach from within rather than from without. 'This book is not for the scientist of the present but for the Theosophist of the future.'

This review would, however, be incomplete if reference were not made to one aspect which will cause the greatest hindrance to the scientist's appreciation of the occult approach. This is the use of Crookes' regular double spiral periodic system (alternate eights and tens) with its 96 elements from hydrogen to uranium, instead of the more modern periodic systems with expanding 'octaves' (8, 18, 32) and with only 92 elements up to uranium. The editors had no choice but to use Crookes' system since that was the basis of the investigators' work, but it brings many anomalies, mainly with regard to the rare earth elements. Of these *Occult Chemistry* describes 19 with different structures corresponding to the whole range of types. Science only recognizes 15 rare earths and finds their properties so much alike that they appear almost to be modifications of only one element.

The book has been published in a large format, 10 inches by 13½ inches, in order to have clear and unfolded diagrams. At the same time this is balanced by the use of large type. There are 230 illustrations, including the 92 natural elements of science (and some additional), fundamental types of sub-atoms (Ether 2, 3 and 4), molecules (compounds) and crystals. For ease of study the elements of each group are shown together on one page, as well as in detail on separate pages. There are two excellent tables of the elements giving in reference form the structure, form and principal characteristics of the elements in atomic number order.

Also of interest to research students is the appendix giving notes and reports of certain of the investigations as examples of the method used by the original investigators. The book is truly a masterpiece and, as the editor says, a life-work.

V.W.S."

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The Field of Occult Chemistry

Chapter I

THE NATURE OF OCCULT CHEMISTRY AND ITS RELATION TO ORTHODOX SCIENCE

Since the time of the alchemists, chemists have been studying the *structures* of *compounds*. For this purpose the methods of science—experiment, analysis, synthesis, deduction—were suitable, as the results testify. This chemistry is still being vigorously studied, but from the time (1879) when Sir William Crookes discovered the "tiny particles of electricity" produced by the discharge in rarified gases, chemists and physicists became increasingly interested in the *structures* of *atoms*. In this field, the direct methods of analysis and synthesis failed almost completely and indirect experimental methods had to be used, particularly those involving electrical discharges in partial vacuum and observations on radio-active substances. The methods of orthodox science are here less suitable and deduction is strained to the limit, as the development of atomic theories has testified.

The highly trained occultist has at his disposal a power unrecognised by orthodox scientists, which enables him so to "magnify" atoms and molecules that their structures can be observed and described. The results of such observations were first published in 1908 in the first edition of *Occult Chemistry* by A. Besant and C. W. Leadbeater, in numerous papers in the *Theosophist* (1924, 1925, 1926, 1932 and 1933) and have been collected and published in a third edition of *Occult Chemistry*, edited by C. Jinarajadasa, assisted by Elizabeth W. Preston (1951). We have examined this work and have made some effort to formulate the present position of Occult Chemistry and to clear the ground for the future development of this new chemistry.

The task of exact correlation between occult and orthodox science has proved discouragingly difficult. The structures

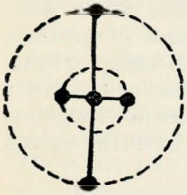
described by the two schools are utterly different in most cases; apparent relationships have been shown on closer study to be merely superficial, or to lack generality. However each system is self-consistent within its own field. Nevertheless we have faith in the validity of the methods used by both schools and we shall continue our efforts to understand the powers and limitations peculiar to each, confident that a rapprochement must come at last.

In order justly to appraise the value of the method of clairvoyant investigation it is necessary to understand something of its nature. "It is not the principle of the microscope which enlarges the image of the object; on the other hand the observer minimises himself in consciousness so that his 'size' is infinitesimally small" (*Theosophist*, 1932, 54, p. 99), and he is therefore comparable in size with the particle under observation (see also *Occult Chemistry*, p. 1). This faculty is an extension of vision, and one may therefore presume that the adage "appearances are deceptive" will apply to objects "seen" in this way with quite as much force as to those seen with the physical eyes. The observer records what he "sees" and it is to be emphasised that the objects do not bear labels stating their nature and on what subplane they exist; these things must be decided by deduction and experience. For example, it may not always be obvious upon what subplane an aggregation under observation exists. The investigators seem to have accepted disintegration into simpler bodies as sufficient evidence of change of subplane, whereas, for example, gaseous hydriodic acid breaks up on heating into hydrogen and iodine which remain on the gaseous level. Here disintegration does not produce change of subplane. When the observer, in addition to his power of vision, is able to function freely upon the plane in question he is presumably less likely to err.

A further possible source of error in the clairvoyant observations is the fact that the atoms are stated to be in constant, complex, and vigorous motion, and that they have to be steadied by an effort of will before detailed examination is possible; this very act may change the particular properties of the atoms with which the physicist deals. Such difficulties as these may account in part for the lack of correlation between the two schools which is noted in many cases.

It might be supposed that, in so far as any division is possible, the occultist would tend to deal with the Life side of chemistry and the scientist with the Form side. Actually the reverse has, generally speaking, been the case. The bulk of *Occult Chemistry* is a study of atomic morphology. The chemist, on the contrary, denied this power of extended vision, has been forced to study the atom in action, to observe its behaviour rather than itself. He has tried to objectivise the knowledge so gained into mechanistic atomic theories, but the modern tendency to discard such pictorial representations in favour of mathematical equations surely represents an admission that the available facts do not yet really justify anything more concrete.

Nevertheless there must be a considerable element of truth in both orthodox and occult view of atomic structure. The experimental data of science cannot be rejected and it must be emphasised that some of the theories based upon it, such as, for example, that of the electronic structures of the elements, fit the data amazingly well. These theories were triumphantly vindicated when the nuclear fission of uranium occurred exactly as predicted. On the other hand, although the orthodox scientist would reject the occult chemistry investigations out of hand, we feel unable to do so, for we have faith in the ability and trustworthiness of the investigators. It is as though workers in the two camps saw an atom from different aspects—as indeed they do—and that the partial vision of each failed to penetrate to the other's field of view; thus, for example, suppose we imagine an atom to be composed of five bodies linked together in the shape of a cross:—and the whole in rapid rotation in the plane of the paper, about the central body as axis. The orthodox scientist might describe this atom as a central solid nucleus surrounded by two orbits, the whole constituting a field of force having certain properties; the occultist might correctly describe the constituent bodies, but because he had stopped the rotation for ease of observation, might fail to appreciate the validity of the other description.



Theosophical Terminology

In this Transaction it has been necessary to use a number of Theosophical terms. The following brief explanation is intended only for those who are unfamiliar with such terminology. Reference should be made to Theosophical literature for further information—*First Principles of Theosophy*, by C. Jinarajadasa, gives a good comprehensive survey.

Our universe is held to exist, as it were, between two extremes of materiality: space on the one hand and dense physical matter on the other. The term space is here used to describe the very acme of subtlety and penetration. From the point of view of our ordinary existence this space is nothingness, but it can hardly be such since out of it has been created the universe. The essence of this space is called *koilon* to avoid the misconceptions produced by such terms as space and void. An effort of will, the Will of the Creator, is required to press back koilon to produce the ultimate building bricks of the universe. These bricks, which may be regarded as bubbles in the koilon, are linked together into larger and denser aggregates until eventually the gases, liquids and solids of our world are produced. A chemical atom would be regarded as composed of a great many such bubbles.

Occultists tell us, from their studies of the ancient philosophical writings supported by their own clairvoyant observations, that our universe contains seven grades of matter composed of aggregates of the bubbles in koilon, of different degrees of complexity and density. Each of these grades of matter is further subdivided into seven sub-grades. Of the 49 such sub-grades the three of greatest density are solids, liquids and gases. Modern science recognises these three states as matter. Some of the other 46 are known but are regarded rather as forces or vibrations than as matter. This will be more obvious from the names given to the seven main grades which are:

Divine (the most subtle).
Monadic.
Spiritual (Atmic).
Intuitional (Buddhic).
Mental.
Emotional (also called Astral).
Physical (the most dense).

In Theosophical literature these are referred to as *planes*, but it is to be understood that the various grades of matter of the different planes are commingled.

It will be realised that adjacent planes are composed of matter of an *order* of density more extreme than anything of which our senses are aware. So great indeed is the difference, that the matter of any plane appears to stand to that of the plane below it in the relation of force to matter (consider how a thought, a creation in mental matter, or an emotion, a creation in astral matter, can cause action in the physical body). Yet the occultist sees them all as grades of matter.

Man possesses a physical body which is his instrument for action in, and contact with, the physical plane. Similarly he is provided with "bodies," or instruments, of astral and mental matter which bear the same relation to their respective planes as the physical body does to the physical plane.

The seven sub-divisions of the densest, *i.e.* physical, plane are:

Ether 1	Etheric	Physical
Ether 2		
Ether 3		
Ether 4		
Gaseous	Dense physical	
Liquid		
Solid		

In this Transaction we are concerned almost exclusively with this physical plane, including, as it does, the four etheric sub-planes. Whereas for the divine plane the unit is the simple bubble in the koilon, the unit for the physical plane is an extremely complex aggregate of such bubbles, called the *ultimate physical atom* or *anu*. Such a particle is unrecognised by orthodox science and is a complex heart-shaped body, according to clairvoyant observation. There are two varieties of anu, positive and negative, and they constitute the ether 1 subplane. The next subplane, ether 2, appears to consist of aggregations of 2, 3, or 4 (sometimes as many as 7) anu held a little apart, evidently by a balance of attractive and repulsive forces. The next subplane in order of density, ether 3, consists of larger and

more complex aggregations of anu, while ether 4 particles are still larger and denser.

The matter of the next or gaseous subplane (*i.e.* atoms and molecules of elements and compounds such as oxygen, nitrogen, carbon dioxide and such others as can be vaporised) is composed of aggregations of these ether 4 units. But this is not all; there is a sharp division between the four ethers and the three denser subplanes, and so we speak of the *etheric* and the *dense physical*. Something else which we do not pretend fully to understand, besides the greater size of the units, differentiates these kinds of physical matter, for the dense physical matter affects our senses and our scientific instruments while the etheric in general does not unless one assumes that electronic phenomena are etheric in origin.

Chapter II

THE ETHERIC AND DENSE PHYSICAL ASPECTS OF THE ATOM

Nomenclature

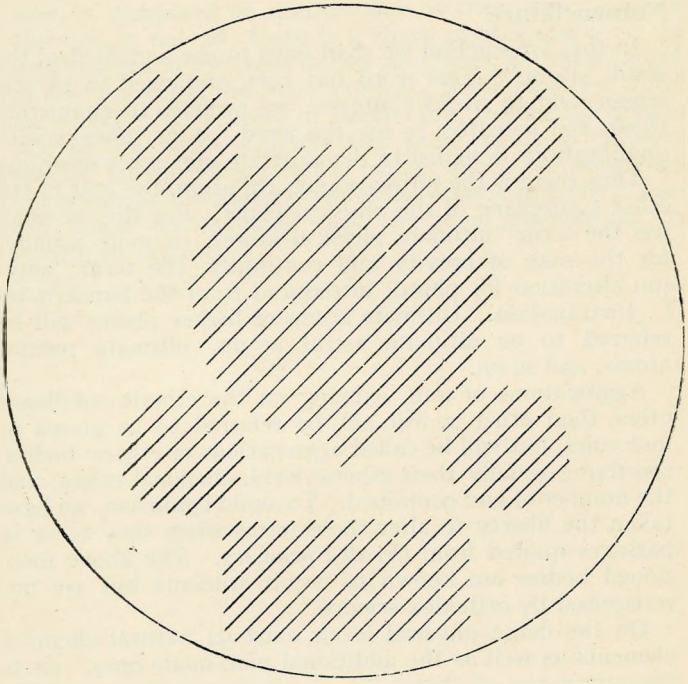
In this Transaction we shall have to use a great deal the word "atom." This word has been employed in several senses, and to avoid confusion we propose to enumerate these, and hereafter to use the word "atom" always with qualifications designed to demonstrate our exact meaning.

Thus there is the ultimate physical atom, the unit of the ether 1 subplane of the physical plane. For this we shall use the term "ultimate physical atom," or more usually, for the sake of brevity and continuity, the term "anu" (no alteration for plural) introduced from the Sanskrit by C. Jinarajadasa. Ultimate atoms of higher planes will be referred to as ultimate astral atoms, ultimate mental atoms, and so on.

Aggregations of anu, existing on the etheric subplanes other than ether 1 will not be referred to as atoms or molecules, but will be called aggregations or etheric bodies, specifying usually their etheric level, chemical origin, and the number of anu contained. To avoid confusion, we have taken the liberty to alter these terms when they occur in passages quoted from *Occult Chemistry*. The above mentioned bodies are known to occult students but are not recognised by orthodox science.

On the dense physical levels exist 92 natural chemical elements as well as the additional man-made ones. As to the structures of these, the occult investigators and the orthodox scientists differ. Now for the purposes of this Transaction we may take it than an atom of, say, sodium, is in itself a real thing, which is, however, but partially described by either school. The atom as it really exists we shall call the "ATOM"; the occultists' description of it we shall call the "occultists' chemical atom"; the orthodox* description of it we shall call the "scientists' chemical atom"; these last two may be abbreviated to O.C.A. and

*We recognise that scientists do not entirely agree among themselves upon the structure of any particular atom.



GASEOUS.

FIG. 1

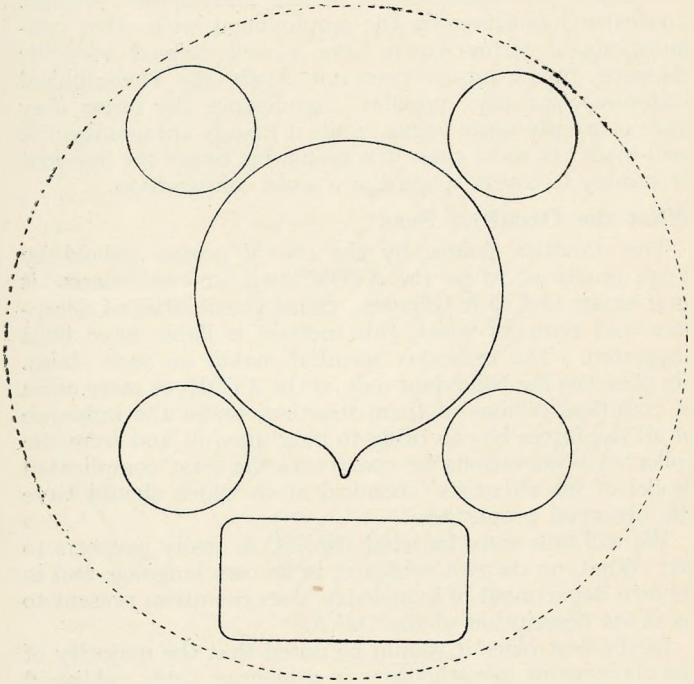
S.C.A. respectively. In every case, the chemical element in question will also be specified, usually by its accepted symbol. Terms used in orthodox science, such as electron, proton, neutron, valency, molecule, will be used only in their accepted sense. Incidentally, we wish most strongly to recommend this practice to all Theosophical writers. Confusion has arisen by the employment with other connotations of terms which have a well defined scientific meaning. Such misuse does not clarify the Theosophical statement, for any "popular" significance the terms may have is usually quite vague, while it merely antagonises the well-read. In most cases it is preferable to use the Sanskrit or frankly to invent a word or a word combination.

What the Occultist Sees

The occultist claims, by the use of powers gained by Yoga practices, to *see* the ATOM itself, and to describe it as it exists and as it behaves. Some possibilities of deception and error to which this method is liable have been suggested. The orthodox scientist makes no such claim. He observes the behaviour only of the ATOM, or more often of countless billions of them together, under the influence of all the forces he can bring to bear upon it, and from the collected observations he constructs the least complicated model of his scientists' chemical atom which should have the observed properties.

We will now consider what the O.C.A. really purports to be. What, on its own evidence, in its own language and in its own department of knowledge, does occultism present to us in its description of the O.C.A.?

In the first place it should be noted that the majority of the clairvoyant investigations in numerous fields published by C. W. Leadbeater have been at levels of consciousness other than dense physical. He described phenomena at the etheric, the astral and higher levels of consciousness, but he did not tell us, for example, how the dense physical heart works. In examining the physical body it was the etheric double with its force-centres with which he was concerned. This is as might be expected, since one of his aims was to show us the life behind the dense physical. In his work on the chemical elements he continued along the same lines, and his descriptions included not only the



ETHER 4

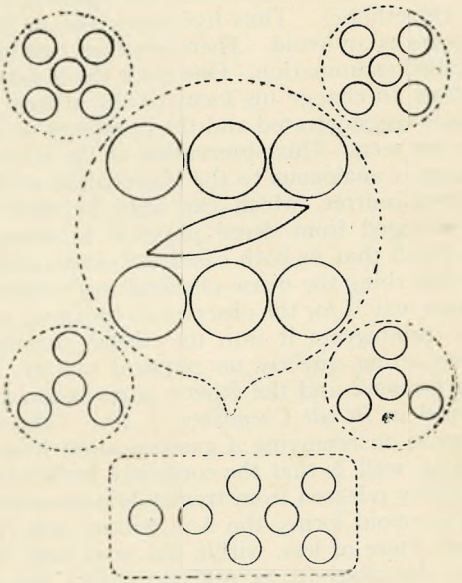
FIG. 2.

physical form but the etheric content and the play of the life forces within the atom.

By clairvoyant observation the occultists' chemical atom is seen first at the dense physical level; it appears to have the same shape whether solid, liquid or gas. At this stage the mere outline of the atom is seen, and possibly vague and hazy lights show up from within. In order to see the groupings of anu within the atom, the observer changes his focus to the etheric. Thus hydrogen seen at the gaseous level appears as an ovoid. There are then two methods for more detailed examination. One is for the observer looking at the atom, to change his focus to the etheric, when the ovoid "wall" is penetrated and the groupings of anu within the atom are seen. This observation of the etheric content of the atom is analogous to the observation of the human etheric force-centres, which can only be seen when the focus is changed from dense physical to etheric, and it must be noted that in both cases the observation is made without disturbing the dense physical and etheric *ensemble.*

The other way is for the observer to break up the gaseous atom, to disintegrate it into its etheric constituents, by will power acting directly on physical matter. This disturbs the *ensemble* and the etheric parts become distorted, as described in *Occult Chemistry*, p. 10. "The first thing that happens on removing a gaseous atom from its 'hole' or encircling 'wall' is that the contained bodies are set free, and, evidently released from tremendous pressure, assume spherical or ovoid forms, the Anu within each rearranging themselves, more or less, within the new 'hole' or 'wall.' " The book describes (p. 12 and pp. 24-27) the results of further disintegration to ether 3, ether 2, and finally to ether 1. At each stage the limiting walls disappear and the contents re-arrange themselves.

For the study of chemistry as a physical science we are concerned primarily with the first method, that of seeing the whole atom, dense physical and etheric, as an entity. The second technique, the disintegration of the gaseous atom to the different etheric levels, may, however, help us in studying the following:—the ether of space and the varieties of etheric aggregations ("molecular ether," *Occult Chemistry*, 2nd Ed., p. 6); the genesis of the elements; the



ETHER 3.

FIG. 3

life-side of chemistry; and the question of chemical combination, since with many compounds disintegration precedes combination (*e.g.* NaCl, *Occult Chemistry*, p. 270; see also Chapter VII).

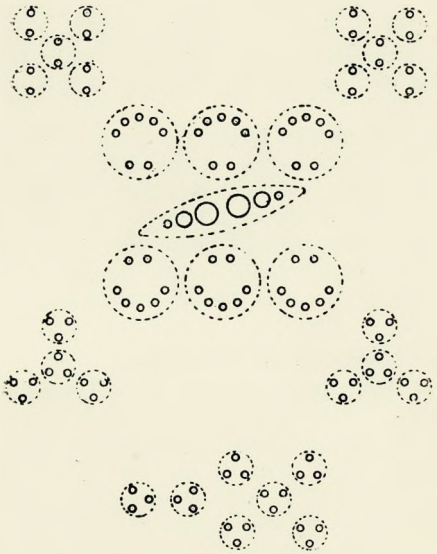
Our first conclusion, then, is that, on the evidence of occultism itself, the O.C.A. consists of a physical form (solid, liquid, or gaseous) with an etheric content. To make this statement very obvious, take the extreme case of the anu; these are admittedly ether 1 and cannot be seen except by etheric sight. If the investigator uses his yoga powers to see the atom at the gaseous level he will see it as a mass and he will see the anu only by shifting his focus to the ether 1 level.

The same idea applies to groups of anu within the atom; only by using consciousness at the different etheric levels will these be clearly visible. He may, of course, have the power to see the atom at all levels at once, letting his consciousness flicker up and down the whole range of the subplanes, but this does not alter the fact that when he sees, for example, the anu this is at the ether 1 level.

The Etheric Content of Nitrogen

By way of illustration consider the nitrogen atom. This is an egg-shaped body and figures 1 to 4 indicate how this would look at the different levels of the physical plane. At the gaseous level (Fig. 1) the outline of the atom is visible. At ether 4 (Fig. 2) the nitrogen balloon, N 110, the ovoid sphere, N 63, two spheres, N 20, and two other spheres, N 24, are visible. Penetrating still further to ether 3 (Fig. 3) the contents of these bodies become visible, *e.g.* inside the nitrogen balloon, N 110, we see six small spheres and a long ovoid. At ether 2 (Fig. 4) the smaller spheres containing only a few anu are seen, *e.g.* inside the long ovoid are six spheres of three different sizes. Then at ether 1 (not illustrated) the anu itself becomes clearly visible.

The diagram of atomic structure as published is a composite picture made by taking what is seen at all the levels and superimposing the results upon one another. The above analysis of nitrogen is built up from data given in *Occult Chemistry*, p. 173, where the disintegration method is used.



ETHER 2

FIG. 4

Dense Physical and Etheric

It is clear then that the O.C.A. is in totality the etheric-dense physical atom, the etheric part being described in more detail than that which manifests as truly dense physical. What are the consequences of such a consideration of the O.C.A.? In the first place it rather suggests that occult chemistry begins where orthodox chemistry leaves off. If the chemists' atom (S.C.A.) is dense physical, the O.C.A. adds its etheric content. These two may or may not correspond with one another in the sense of being congruent; that we have to discover.

Then again, in studying the reactions between atoms to form compounds, we have to consider whether such combination is effected by the lower, that is, the dense physical part of the atom, or whether the subtler etheric part is the prime mover. The lines of force between the anu remind one of the flow of prana along the channels of man's etheric double, and knowing how this influences man's physical reactions we are inclined to the idea that these lines of force within the atom play as important a part as the anu themselves. In other words, diagrams of the lines of force may be more useful for certain investigations that the. diagrams of dots. Thus the recognition that the O.C. A includes more than dense physical matter should help us to judge to what extent certain chemical and physical phenomena may be explained by occult chemistry and by purely material (dense physical) chemistry. It will help us to evaluate the limitations even of occult chemistry since this deals with subtle forces which may not be assessed by dense physical instruments.

Another consequence is a clue to the understanding of the nature of the bridge between etheric and dense physical. Occultism tells us that the space between atoms is full of anu and combinations of anu which do not respond to dense physical instruments. Thus "the space around it (the chemical atom) is filled with millions of loose Anu" (*Occult Chemistry*, p. 28).

"Etheric atoms combine to form aggregations in many different ways, but combinations involving fewer atoms than eighteen which give rise to hydrogen, make no impression on the physical senses nor on the physical instru-

ments of research . . . Combinations below eighteen in number give rise to three varieties of ether." (*Occult Chemistry*, 2nd Ed. pp. 5-6).

Dense physical matter is formed, then, by the densification of etheric matter. In what does this process consist?* Is it mere agglomeration, as is presumably the change from the matter of one etheric subplane to that of the next lower, *e.g.* from ether 3 to ether 4? Or is it the rapid motion of the etheric aggregations together with the influence of the lines of force, which in themselves create the lower subplanes? In other words, is it, perhaps, the whirling and/or the lines of force which give these particles their power to affect our physical senses and scientific instruments? The quotation already given from page 10 of *Occult Chemistry* seems to suggest that this may be the case. Also:—"each atom has a spherical or oval wall, within which the various groups of Anu move" (*Occult Chemistry*, p. 28).

The matter pushed back to form the wall is said to be ether 1 and also astral matter (see also following section). This surely refers to the densification of etheric to dense physical matter, since elsewhere we understand that the pushing back of space of a higher level produces matter of a lower level. "Fohat digs holes in space."

Thus the recognition of the O.C.A. as the ATOM, looked at from the etheric aspect, brings us one stage nearer to the life behind chemical processes. Although, as stated earlier, the occultist appears to deal with atomic morphology, it is at a higher level than dense physical, and one would expect *structure* at such levels to affect *action* at a lower level.

*Mr. C. Jinarajadasa's comment on this is that, as the elemental essence (the ensouling force) changes, the groups shift to the levels ether 3 or 4, or gaseous, liquid or solid.

Chapter III

THE WALL OF THE ATOM

When the time came for the Logos to breathe forth His Universe, He selected a region of Space within which He would operate. He encompassed this region with a Ring-Pass-Not, that mysterious boundary which cannot be overstepped by any of the manifestations in His universe. As above so below; as the Universe, so the atom has its ring-pass-not, the sphere beyond which its component anu cannot pass. This is called in *Occult Chemistry* the "wall" of the atom, but the statements concerning it are somewhat confusing, and give the impression, confirmed by later statements, that the investigators found considerable difficulty in this part of their research.

The Creation of Matter

Not only the chemical atoms, but etheric aggregates and ultimate atoms of the physical and higher planes were seen to possess a "cell-wall," or to exist within a "hole in space." In trying to understand the nature of this wall it is easiest to study the simplest cases first, *i.e.* to work from above downwards; for there is little doubt that the factors causing the formation of the wall are similar at all levels. In the beginning, then, before the creation of our universe, exists Space; Space not empty, but completely filled with the inconceivably dense koilon (*Occult Chemistry*, p. 16 *et seq*). "Fohat digs holes in space"—the breath of the Logos fills the "waters of space" with bubbles, holding them open against the tremendous pressure of the koilon by His force. Matter as we know it is in reality the very negation of matter, *i.e.* the absence of koilon, for these bubbles are the fundamental units, the constituents of all matter of which we at present know anything. Indeed we may add it is only by virtue of these bubbles being filled with His consciousness, of which we are a part, that we are able to cognise them at all—koilon, being outside His consciousness,

being in fact the field upon which it acts, is, to us, nothingness.

These bubbles are the ultimate atoms of the divine plane. Each has a wall, but as is said of the ultimate physical atom its "wall" is the pressed back "space." The wall belongs to space, not to the atom. (*Occult Chemistry*, p. 15). Bearing in mind the analogy of bubbles in soda water whose boundary is the water rather than the gas, the idea of this particular kind of wall is not difficult to grasp.

On the plane below, a unit comprising 49 of these bubbles, whirled together and held in a definite pattern by the force of the Third Logos, constitutes the ultimate *monadic* atom. This atom also has a wall consisting of pressed back space. But what is the nature of this space? At first one imagines that it is again koilon; but then, if koilon constitutes the walls of the bubbles, it must interpenetrate this monadic atom, or to put it differently, if koilon is pressed back to form the wall of this atom, then there is nothing left to wall off the constituent bubbles, which could only lose their separate identity by expanding into the larger hole thus created. This they apparently do not do, so it cannot be koilon that is pressed back by the creation of the monadic atom.

If, then, it be agreed that koilon interpenetrates the atom—as water interpenetrates a coil of pearls dipped into it—what is there left to constitute its wall? There seems only one possible answer—the matter of the divine plane. Nor is this answer unreasonable from the point of view of our analogy. The limiting wall is said to be formed by the rapid revolution of the atom. Suppose, then, our water to be thick with minute pearls, representing the bubbles or ultimate divine atoms, and with small clusters of pearls representing the matter of the divine subplanes, while the monadic atom is represented by a coiled string of these pearls rapidly whirling as a whole. Would it not fling the loose pearls and clusters out of its sphere of revolution, cutting out for itself a hole containing water, representing koilon, but no pearls?

The Dimensions of Space

Alternatively, one may consider the matter from the point of view that each plane has one less dimension or

degree of freedom than the plane above. One may imagine particles of any particular plane free to move in a certain maximum number of directions, mutually at right angles, the number being characteristic of the plane. Then suppose a force strong enough to disrupt these atoms and recombine them into bigger and more complicated units, the ultimate atoms of the plane next below. The electro-magnetic or gravitational force acting between these much heavier atoms would be very much greater than that acting between the original atoms,—so much so that their freedom of motion would be considerably curtailed, and this might well express itself in the almost complete closing to them of one dimension, the loss of one degree of freedom. To use a crude illustration, particles of water vapour in the clouds are free to move in three dimensions, with a very slight extension into the fourth. Yet as soon as these particles combine into a raindrop, they are forced to move in the third (up and down) dimension until they come to rest, *e.g.* on a smooth road, where they have freedom of movement practically in only two dimensions, with slight extension into the third.

Now any dimension of space can be defined as the boundary between two spaces of the next higher dimension; thus a square (second dimension) is the boundary between two adjacent solid cubes (third and next higher dimension). Hence these newly constituted atoms should constitute boundaries between portions of space of a higher dimension, *i.e.* the world of the original atoms; that is to say these new atoms should be impenetrable by the original ones (see note below), which should therefore surround them, forming a kind of wall—the same conclusion as we reached by a different line of argument.

NOTE.—This does not mean that, for example, an astral body cannot penetrate a physical; it can, but its particles would pass *between* the widely spaced physical atoms, and not *through* the actual atoms.

Boundaries of Physical Atoms

This process can evidently be continued plane by plane. The whirling atoms of a plane will push away the smaller atoms of the plane above, and probably the still smaller atoms of the next higher plane. Owing, however, to the

inevitable open structure of the large atoms, they would have less tendency to push back the tiny atoms of the still higher planes, some of which might penetrate inside. Imagine how complicated the phenomenon becomes by the time the ultimate physical atom is reached, and pity the investigators who patiently tried to determine the nature of the atom's wall! For we may suppose that this anu will repel astral and probably mental ultimate atoms (and aggregations thereof belonging to lower astral and mental sub-planes), but that it will be freely penetrable by atoms of higher planes.

The statement "each atom is surrounded by a field formed of the atoms of the four higher planes, which surround and interpenetrate it" (*Occult Chemistry*, 2nd Ed.* p. 21) seems partially to describe the phenomenon we have envisaged. We may also understand how it is that the term "space" is used in *Occult Chemistry* with connotations that are almost patently different in different contexts. For "space" is evidently a relative term; it may refer to koilon itself, *i.e.* to "infinite space," or alternatively to space of any particular number of dimensions, filled with the atoms of the corresponding plane.

When we come to the matter of the etheric subplanes, consisting of aggregations of anu, and to the chemical atoms, things become, if possible, even more complicated. These aggregations would be expected to behave like their constituent anu in repelling atoms of the planes immediately above the physical, but in addition they would be impenetrable by anu and, of course, by other aggregations of anu, though in all probability freely penetrable by the much smaller atoms of still subtler planes.

Two passages may be quoted from *Occult Chemistry* which seem clearly to describe such a state of affairs. Dealing with the building of a hydrogen atom,—"as this triad whirls round, it clears itself a space, pressing back the undifferentiated matter of the plane, and making to itself a whirling wall of this matter" (*Occult Chemistry*, p. 12). Here the wall is definitely stated to consist of the undifferentiated matter *of the plane*, clearly the physical plane. (By "undifferentiated" is meant presumably free anu, and

**Occult Chemistry*, 3rd Ed. p. 13, omits this detail.

etheric aggregates other than definite disintegration products of the chemical elements.) It must be remembered, however, that this quotation is taken from an account of the early researches (1895) when probably it had not occurred to the investigators to use higher powers of vision, in order to determine whether astral, mental, etc., atoms had any part in building the wall. Later in describing typical ether 2 aggregates:—"Each aggregation is surrounded with an apparent cell-wall, a circle or oval, due to the pressure on the surrounding matter caused by its whirling motion. The surrounding fields strike on each other and the groups and rebound, dart hither and thither, for reasons we have not distinguished." (*Occult Chemistry*, p. 26).

Elsewhere (*Occult Chemistry*, 2nd Ed.* p. 21) it is stated that this surrounding field is formed of atoms of the four higher planes. Continuing our analogy of the bubbles in water, we may perhaps liken this field to the surface tension film at the gas-water interface. We may remember that water is not completely unaffected by being pressed back by the bubble of gas, for the water immediately surrounding the bubble is in a state of tension—it has gained potential energy. Two such bubbles, or oil globules in an emulsion, when they approach at a velocity below a certain value, are prevented from coalescing or even from quite touching one another by this interfacial film, and rebound like billiard balls. The resemblance between the two cases seems too close to be fortuitous.

It may be expected that the presence of a physical atom will definitely set up a strain, tension, or field of force in the surrounding matter of higher planes, pressed back to make room for it. We may conceive that a discontinuity in, say, astral matter, caused by a physical atom, will set up a strain expressing itself as a sort of skin of astral matter round the atom, just as a discontinuity in a fluid caused by a particle of gaseous or solid matter, sets up a strain expressing itself as a surface tension film round the particle.

Several references are made in *Occult Chemistry* to the result of breaking up chemical atoms or etheric aggregates. Thus, for example, when etheric aggregates are "pulled out of the cell-wall" they apparently break up at once

*The 3rd Ed. omits this reference to the four higher planes.

into aggregates belonging to the subplane above. (*Occult Chemistry*, p. 25.) Again:—"The first thing that happens on removing a gaseous atom from its 'hole' or encircling 'wall,' is that the contained bodies are set free, and, evidently released from tremendous pressure, assume spherical or ovoid forms, the Anu within each re-arranging themselves more or less, within the new 'hole' or 'wall'." (*Occult Chemistry*, p. 10).

These references to removal from the cell-wall are a little difficult to understand. If the wall belongs wholly to the surrounding matter, then, wherever the atom is, it must have a wall; if removed therefrom another would form instantly. The wall, however, could be distorted or expanded, either of which might conceivably cause the contents to break up into smaller units; thus agitation will sub-divide gas bubbles in a liquid. The apparent release from great pressure which accompanies the break up of a chemical atom is an interesting observation. It seems likely, however, that the release is rather from internal cohesive forces than from external pressure; just as a particle of liquid water removed from the bulk and evaporated into the atmosphere, expands greatly with passage into a higher subplane, although the external pressure remains the same.

We have now quoted in illustration practically all those parts of *Occult Chemistry* where information is given concerning the wall of the atom, with the exception of the following:—"When the gaseous atom of hydrogen is raised to the E4 level the wall of the limiting spheroid in which the bodies are enclosed, being composed of the matter of the gaseous kinds, drops away and the six bodies are set free." (*Occult Chemistry*, p. 10). This is an unsatisfactory statement which seems to be at variance with others quoted. It seems to imply definitely that the wall is part of the gaseous atom, for if, as stated elsewhere, the wall belongs to space and not to the atom, the hydrogen atom would need to be surrounded with a thick cluster of other gaseous atoms for them to constitute its wall, whereas we know that atoms are only scattered thinly through a gas at atmospheric pressure; besides atoms so arranged would have to serve mutually as walls for each other, which implies they are in contact and in effect devoid of any wall. This statement,

however, is quoted from the 1895 researches, *i.e.* it was made before this matter had been fully studied, and must, we feel, be discounted as a slip or loose statement.

Later research seems to confirm the view here expressed as to the nature of the wall. "A sphere-wall is a temporary effect, caused by one or more Anu in rotation. Just as a stream of air under pressure will make a hole on the surface of water, by pushing back that water, so it is with the groups. As they revolve, the force of their motion drives back the circumambient medium. That medium thus driven back by the atom element as it moves round its axis is the space around it filled with millions of loose Anu; it also drives back denser parts of what is called astral matter. For instance the medium driven back by each separate funnel in Sodium is astral atomic matter." (*Occult Chemistry*, p. 28). Further, C. Jinarajadasa speaks of the wall as being in some ways illusory. It appeared to be created by forces radiating from the centre of the atom, which after travelling a certain distance returned to the centre. (*Occult Chemistry*, p. 15).

Summing up, we see that the outer surface or wall of the atom is a more or less illusory thing, in the sense of having no independent existence. Its nature is conditioned rather by the surrounding matter than by the atom itself. In so far as it has any substance, it would appear to consist of etheric and astral matter, together possibly with that of even higher planes, the whole probably in a state of strain.

Chapter IV

ATOMIC STRUCTURES: ORTHODOX AND OCCULT THEORIES COMPARED

In the two preceding chapters we have been studying the occultists' chemical atom in its own territory; that is to say, knowing something of the technique used, we have been endeavouring to understand the significance of the descriptions given by the clairvoyant investigators. We should now study the scientists' chemical atom, examining the scientiffc data upon which modern theories of atomic structure are founded, and taking into account the observations of clairvoyant investigators. If our conclusion, that the occultists' chemical atom is largely the etheric aspect of the atom, is correct, while the scientist deals, or thinks he deals, exclusively with dense physical matter, we should not perhaps be surprised if we fail to discover much correlation between occult and orthodox views. Nevetheless it is felt that some preliminary comparisons should be attempted, especially since there are many theosophists who are puzzled and troubled by the wide discrepancies between the two schools.

The Nucleus

In the occultists' chemical atom (O.C.A.) there is to be discerned nothing which bears any obvious relation to the nucleus and electronic orbits of the scientists' chemical atom (S.C.A.). Superficial resemblances there are in plenty; for example, many O.C.As. have a "grand centre" which has been likened to the nucleus of the S.C.A.; the anu and groups of anu move about in the O.C.A. with great rapidity on definite orbits. Some of the oft-recurring groups of anu might be likened to the simple body known as the neutron or to the charged bodies, the positron and the electron (the latter will be considered more fully later). As soon as these claims are seriously studied, however, it becomes evident that they have no secure foundation, whether comparisons

are made on the basis of numbers of particles, or on the assumption (implicit in *Occult Chemistry*) that the anu are alone and equally responsible for the mass of an atom.

The terms positron and neutron have become well established in atomic theory where the neutron is regarded as a simple body, the positron and the electron as simple bodies with positive and negative charges respectively, and the proton as a neutron plus a positron. Thus the S.C.A. may be pictured as comprising a central nucleus surrounded by a cloud of electrons; the nucleus is composed of two kinds of primary building units, protons and neutrons. This is a gross over-simplification as may be seen by the following quotation: "Positrons have only a fleeting existence in matter, reacting with electrons in a 'reaction' in which an electron and a positron disappear simultaneously with the emission of electro-magnetic radiation." (*Science Progress*, 1953, p. 194). However, one cannot shirk the issue by saying that neutrons, positrons and electrons are not real. The current fashion to use mathematical equations, which have more fluidity, yet greater exactitude, than a model, does not mean that the S.C.A. is a vague mysterious conception. Although scientists may confess ignorance as to the exact nature of the electrons and the more complex protons, and their gyrations in the S.C.A., they are definite and in agreement as to the number of each and as to their approximate arrangement in the S.C.A. of every element.

We believe that the recognition of the O.C.A. as the etheric content in addition to the dense physical is the first step towards an appreciation of both views. It has been suggested by some that the entire O.C.A. might be identified with the nucleus of the S.C.A., the electrons in their orbits surrounding the nucleus having escaped notice by the clairvoyant investigators. The considerations which prompted this suggestion are not far to seek. Physicists then admitted that they knew very little about the nucleus, so that the O.C.A. could conveniently be dubbed "nucleus" and so be disposed of without doing much violence to current scientific theories. It would be fatal, however, to accept such a view even as a working hypothesis without further evidence, if only because scientists' theories as to the structures of atomic nuclei are also at variance with the occult structures.

Evidence for the identity of the O.C.A. and nucleus is, in fact, hard to find; *Occult Chemistry* provides little material for any conclusion upon this point. The later researches upon compounds, however, provide definite evidence against the suggestion. Scientists have, at least until recently, been insistent upon two points:—(1) the nucleus is extremely small compared with the total volume of the S.C.A. of any element, (2) the nucleus has nothing to do with combination between atoms to form compounds, such combination concerning only the outermost shell of electrons. As a consequence, in compounds the nuclei of the component atoms are situated at a distance apart that is large in comparison with their own diameters. Now, in all the compounds studied by C. W. Leadbeater, the diagrams and descriptions suggest that the component O.C.As. were separated by a distance less than their own diameters, or else were actually interlocked, or even disrupted and the contents used in building the molecule of the compound. The discrepancy between the above descriptions is entirely outside the possibility of error in the clairvoyant investigations, so that we must conclude that the O.C.A. of an element cannot be identified with the nucleus of the S.C.A. of that element.

It must be emphasised again, however, that scientific theories are being continually modified and revised. What was generally known as the Bohr atom (small heavy nucleus with planetary electrons), which for a time satisfied chemists and physicists alike, is now largely discredited, especially by the wave mechanics school of physicists. The latter certainly conceive of the atom as full of intense internal activity, tallying thus far with C. W. Leadbeater's descriptions, but their ideas are hard indeed to understand by one not learned in higher mathematics, and, moreover, are not entirely acceptable to the chemists.

The Electron

It is implied in Sinnett's introduction to the second edition of *Occult Chemistry* that the ultimate physical atom must be identical with the electron. We understand that this view was disclaimed by C. W. Leadbeater. On

the other hand, he states in several books (e.g. *Inner Life*, II, p. 265) that the ultimate *astral* atom may be identical with the electron. This view is endorsed by Kingsland in *The Physics of the Secret Doctrine*. It is based on the then accepted belief that the electron had 1/800—1/1000 of the mass of the hydrogen atom, which, according to the occult statements, contains 18 anu, each of which, if disintegrated, could recombine into 49 astral atoms, *i.e.* 882 astral atoms in all. It is now known that the electron is 1/1800 of the mass of the hydrogen atom. While this weakens the evidence, it must not be forgotten that the figure for the mass of the electron is based solely upon its behaviour in electric and magnetic fields, while the implicit assumption that the mass of an anu is the same as that of 49 ultimate astral atoms may not be valid. The possibility should not be ignored that the electron may even be on the mental plane.

A totally different suggestion was advanced by Sutcliffe in *Studies in Occult Chemistry and Physics*. It is based upon the assumption that the hydrogen atom is composed of sixteen negative or female and two positive or male anu (whereas *Occult Chemistry*, p. 38 records two varieties of hydrogen containing respectively: 9 positive and 9 negative anu; or 10 positive and 8 negative anu.); that a hydrogen ion is formed by the loss of the two positive anu, and that this body, when transferred from the gravitational field of the earth to that of the sun, becomes the electron. We understand that this view was not regarded favourably by C. W. Leadbeater, who was investigating the problem until shortly before his death.

It is perhaps not so strange as it used to seem, that the clairvoyant investigators fail to "see" any particle which can be positively identified with the electron. The physicists themselves seem uncertain as to whether it is a particle or a wave-motion—or both, as the Uncertainty Principle affirms. One is tempted to suggest that this uncertainty as to the position and nature of an electron might be due to its freedom to oscillate along an axis in the 4th dimension, which would take it periodically out of, and back into, our physical world. This is tantamount to suggesting that the electron is astral in nature, which runs counter to the statement that particles smaller than dense physical do not affect physical instruments. We suggest, however, that, though

this statement is true for such particles when at rest or moving at low velocities, yet when they are moving at extremely high velocities, and/or are electrically charged, they can then be detected by certain physical instruments.

Atomic Weights

In *Occult Chemistry* some stress is laid on the fact that the number of anu in the O.C.A. of any element, divided by the number in hydrogen (18) gives a number close to the accepted atomic weight of the element on the hydrogen scale.

It is taken for granted that this should be so, but it can hardly have been realised what important assumptions are involved. The numbers of positive and negative anu are not quoted for any elements except hydrogen and oxygen. Most elements probably contain equal numbers of each kind, like oxygen and one variety of hydrogen. However the other variety of hydrogen contains unequal numbers (10+ and 8—) while O.C.As. containing uneven numbers of anu must have at least one more of one kind than the other. Therefore, it must be supposed that all anu, positive and negative, have equal masses. Moreover it must be assumed: that the total mass of an atom is the sum of the masses of the anu, no mass being contributed from any other source; also that the mass of an anu is entirely unaffected by its velocity or by its proximity to other anu, despite the almost inconceivably small distances involved, and the intense forces linking the anu in their groupings within the O.C.A. (*cf.* Aston's "packing fraction"). It now appears that such possibilities in fact did occur to C. W. Leadbeater. (*Occult Chemistry*, p. 351).

In the light of these observations, it would seem superfluous to exercise ourselves to explain why the atomic weight is not always equal to the occult "number weight." Rather should we marvel at the extraordinary closeness of the agreement.

Isotopes

What we have said above lessens the weight of the criticism levelled at the *Occult Chemistry* investigations, to the effect that the number weight ought not to agree

with the chemical atomic weight in the cases of elements with isotopes, but with that of whichever isotope was observed. In another direction, however, it must be frankly admitted that the discovery of isotopes tends to throw some discredit upon the occult investigations. Since there is certainly approximate proportionality between the atomic weights and the total number of anu in the elements we should expect isotopes of an element, differing in atomic weight by one unit or more, to contain different numbers of anu. Yet, if this were the case, and if, as we are told, many atoms of each element were studied, it seems incredible that so few isotopes should have been observed clairvoyantly, even granting that their existence was not suspected at the time of the investigations published in *Occult Chemistry*. It is not sufficient to suggest, as C. Jinarajadasa has done, that the isotopic constitution of the elements is studied under conditions which subject the atoms to intense electrical and magnetic fields, which might partially disrupt the O.C.As. The fact remains that the average atomic weights of the naturally occurring isotopic mixtures calculated from mass spectrograph data, agree remarkably well with those determined chemically. In addition, partial or complete bulk separation of isotopes has been effected by less drastic physical means in the cases of several elements, notably hydrogen.

Conclusions

This brief comparison of occult and orthodox theories of atomic structure indicates that the gap between them is rather wide in many places. We conclude that the O.C.A. *in its entirety* cannot be regarded as constituting the nucleus of the S.C.A., yet neither is there *any part of* the O.C.A. of any particular element which can with certainty be identified with the nucleus of the S.C.A. of that element. At least three different suggestions have already been made as to clairvoyantly observed particles which might be identified with the electron. In view of the various factors which might influence the mass of an atom, the agreement between the number weights of *Occult Chemistry* and the chemical atomic weights is considered satisfactorily close, though it seems surprising that so few isotopes have been observed clairvoyantly. In mitigation of the seriousness of

these discrepancies, we suggest that the occultist deals mainly with the etheric aspect of the ATOM, and also that alternative explanations of scientific data are probably to be found which might be more in line with the occult data.

CHAPTER V

OCCULT CHEMISTRY AND THE PERIODIC LAW. VALENCY AND SHAPE

The periodic or cyclic law in Theosophy usually is concerned with time as one factor. Thus certain kinds of events such as births, seasons, races, globes and chains recur in time in a cyclic way. Sometimes the past is obliterated by the present, as in globes and chains, while in other cases the past remains with the present as in the growth of a tree with its annular rings and its regularly (cyclically) placed leaves.

The periodic law as understood by chemists replaces the time factor by mass. Thus by placing the elements in atomic weight order, the elements in each successive octave are similar to the corresponding elements of other octaves. Every eighth element reproduces the same or similar properties. It is as if there were seven different ways of increasing the mass of an atom and the same method is not used again until all seven ways have been tried, and this always in the same order. When one way is repeated it does not always give the same increase in mass, but it does give the same or similar chemical properties.

We have somewhat laboured this point because there is a tendency to look upon periodic tables of the elements as mere classifications into groups of similar elements. The periodic classification really shows that the properties of the elements are a periodic function of the mass of their atoms, and this *is* the periodic law. Whether or not this mass is itself a function of time, thus making the chemical periodic law similar to other cyclic processes we do not know. The table was not drawn up by Mendeleeff to indicate the order of evolution of the elements.

Having thus made it clear that the chemical periodic law is concerned with mass, we will consider how the occult structures fit into the resulting tables. The first

Table I.

MENDELEEF'S PERIODIC TABLE.

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	O
	H								He
1	Li	Be	B	C	N	O	F		Ne
2	Na	Mg	Al	Si	P	S	Cl		A
3	K	Ca	Sc	Ti	V	Cr	Mn	Fe Co Ni	
	Cu	Zn	Ga	Ge	As	Se	Br		Kr
4	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru Rh Pd	
	Ag	Cd	In	Sn	Sb	Te	I		Xe
5	Cs	Ba	[La	—	—	—	—	— — —	
	—	—	—	RARE EARTHS					—
6	—	—	—]	Hf	Ta	W	Re	Os Ir Pt	
	Au	Hg	Tl	Pb	Bi	Po	At		Rn
7	Fr	Ra	Ac	Th	Pa	U			

Rare Earths: 15 are known. Mendeleeff's original table leaves room for 19.

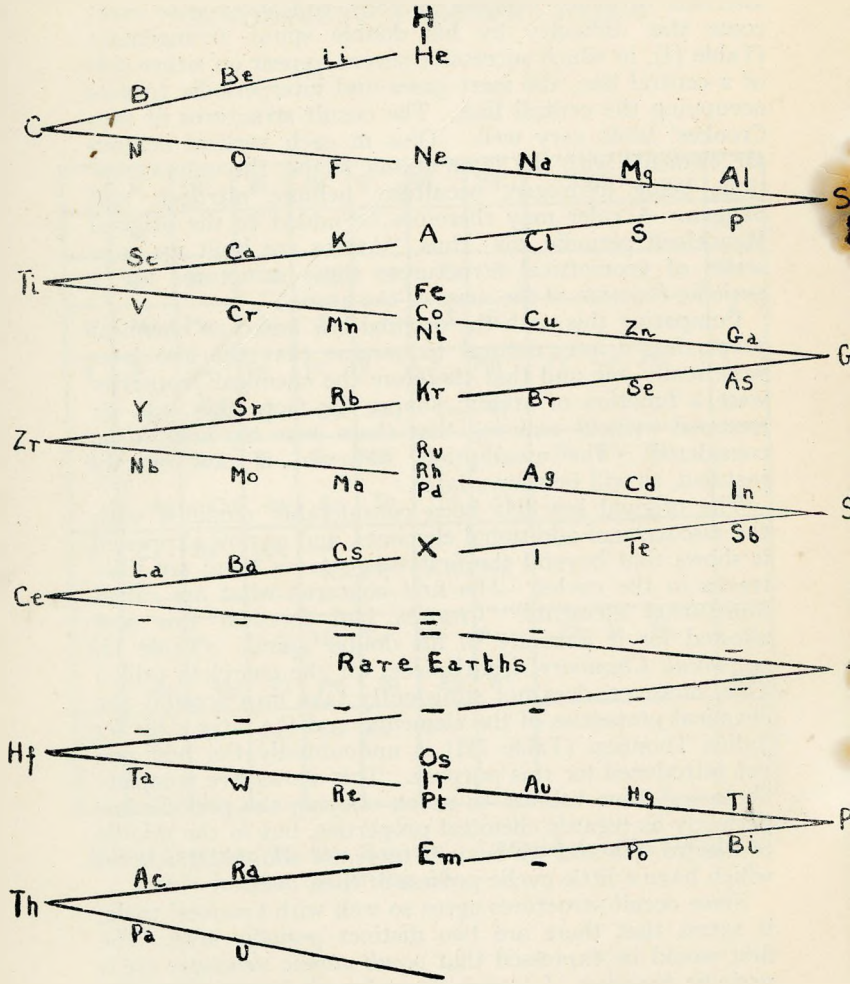
incomplete one, as drawn up by Mendeleff (Table I), had one peculiarity: the elements only truly corresponded in alternate octaves. Crookes, in 1887, endeavoured to overcome this difficulty by his double spiral arrangement (Table II), in which successive sevens appear on either side of a central line, the inert gases and interperiodic triplets occupying the central line. The occult structures fit into Crookes' table very well. Thus in each vertical column are elements with the same atomic shape, the only exceptions being hydrogen, occultum, helium, nitrogen and oxygen. A rider may therefore be added to the original Mendeleeff periodic law; thus, "Atoms are built up on a series of geometrical structures: these structures are a periodic function of the mass of the atoms."

Comparing this with the original law based on chemical properties, it was natural to assume that the two laws were really one and that therefore the chemical properties were a function of atomic shape; in fact, this was so assumed without realising that there were *two* laws to be considered. The assumption, however, is not entirely justified, as will be shown later.

The original law has been considerably modified with the discovery of additional elements, and as now expressed it shows that beyond the first two octaves there are side-tracks in the cycles. The first concerns what are called *transitional* elements. Crookes had foreseen this and allowed for it partially in his double spiral. (Table II, see *Occult Chemistry*, frontispiece, for the complete table.) This, however, does not sufficiently take into account the chemical properties of the elements, and the later table by Julius Thomsen (Table III) is undoubtedly the best one yet introduced for this purpose. This shows five complete "octaves" from lithium to radon obeying the periodic law perfectly as regards chemical properties, but in the middle of the 3rd, 4th and 5th octaves there are additional octaves which have a little cyclic process of their own.

Since occult structures agree so well with Crookes' table, it seems that there are two distinct periodic laws. The first would be expressed that *occult atomic structures* are a periodic function of atomic mass for all known elements.

CROOKES' PERIODIC TABLE
(Double Spiral)



The above is a simplified form. The table really requires three dimensions. A more complete form is given in *Occult Chemistry*, frontispiece.

Note: The original symbols have been used in this table.

The second is the one recognised by chemists, that *chemical properties* are a periodic function of mass with the rider that there are at least two cycles running through the elements. We will called these two laws the structural and the property periodic laws. The fact that the two do not coincide even in the first two octaves brings us to the conclusion that *chemical properties are not necessarily a function of* (occult) *shape*, or, to be more accurate, of etheric content and shape.

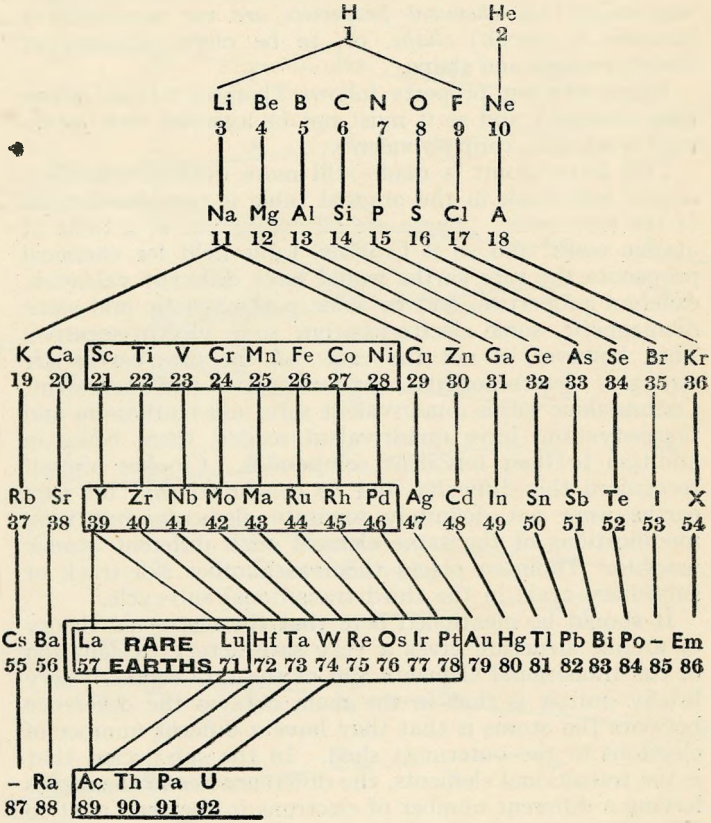
Valency as one property follows Thomsen's table rather than Crookes', and so it must not be assumed that structure necessarily controls valency.

This latter point is made still more evident when the second side-track in the original table is considered, that of the *rare earths*. These are all contiguous in a table of atomic mass, and so if Crookes' table held for chemical properties the rare earths would have different valencies, different properties, and be some paramagnetic and some diamagnetic, some electro-positive, some electro-negative. This, however, is not the case: all the rare earths are strongly electro-positive, paramagnetic and tervalent. Cerium alone forms quadrivalent salts and lanthanum and praseodymium have quadrivalent oxides, these being in addition to their tervalent compounds. Crookes himself recognised this difficulty and he concluded that the rare earths were not definitely separate elements, but were modifications of the same element with different atomic weights. Thomsen places them as another side-track or subsidiary cycle in the third transitional sub-cycle.

It should be mentioned here that the electronic theory of atomic structure gives a very satisfactory explanation of the transitional elements and of the rare earths. Very briefly put, it is that in the main octaves the difference between the atoms is that they have a differnt number of electrons in the outermost shell. In the sub-cycles, that is the transitional elements, the difference lies in the atoms having a different number of electrons in the shell next to the outermost one, the latter remaining constant. In the sub-sub-cycle, *i.e.* the rare earths, it is the shell which is second from the outermost that has a different number of electrons. Thus the farther away from the outside that the change takes place the less is the effect upon the behaviour

Table III.

THOMSEN'S PERIODIC TABLE



Element 43 is now Tc, 54 Xe, 85 At, 86 Rn, 87 Fr.

of the atom, so that the rare earths are very much alike, although they show differences in atomic weight as great as those between the elements in the first octave, lithium to fluorine, where, however, the change is in the outermost shell.

There is another significant point about the two periodic laws, taking Crookes' and Thomsen's tables as representing them; in Crookes' table there is room for 19 rare earths, while in Thomsen's there is only room for 15. So far chemists have only found 15 rare earth elements, and if any more should be discovered it would mean drastic changes in our ideas of "atomic number." The atomic number of an element, as introduced in 1913, was a function of the square root of the frequency of Barkla's secondary X-rays. It has since been shown to be the same as the number of electrons in the shell, or the number of free positive charges in the nucleus. (See *Interpretation of the Atom*, by F. Soddy, 1932). This figure seems to be quite definite; it is not arrived at by placing the elements in atomic weight order, although it happens to coincide almost perfectly with such an arrangement. The atomic number of uranium, *i.e.* the number of electrons in the shell, is 92. In Thomsen's table it is the 92nd element, whereas in Crookes' table it is the 96th. This discrepancy will have to be considered.

To draw some conclusions: if the occult structures have been given correctly to the rare earths and if the electronic theory has only a vestige of truth, we have to agree to the following:—

(1) That occult structure does not necessarily or in every case bear any relation to electronic structure.

(2) That occult structure does not always influence chemical properties including valency.

(3) That a periodic law for occult structures holds for all the elements without exception. (Structural periodic law.)

(4) That there is another periodic law concerning the chemical properties of the elements, comprising three different cycles, a main cycle, a sub-cycle, and a sub-sub-cycle, the minor cycle being introduced in each case in the hird period of the major cycle. (Property periodic law.)

Chapter VI

VALENCY AND THE LIFE BEHIND THE ATOM*

Chemistry recognises a qualitative and a quantitative aspect of valency. The quantitative or numerical aspect concerns the number of atoms of hydrogen or oxygen with which an atom of the element in question will combine; thus sulphur shows a valency of 2 towards hydrogen (H_2S) and of 2, 4 or 6 towards oxygen (SO, SO_2, SO_3). The qualitative aspect concerns the nature of the link between the atoms; three types are recognised, electro-valency, giving ionisable compounds (*e.g.* NaCl), co-valency, giving non-ionisable compounds (*e.g.* CH_4) and co-ordinate valency, giving co-ordination compounds (*e.g.* cobaltammines). These are explained in terms of the electronic structures of atoms.

The occult researches on compounds agree with orthodox chemistry in regard to the numerical aspect of valency, but present a complicated picture in regard to the nature of the link between atoms. This latter will be considered in the following sections; here we are concerned to discover whether the clairvoyant researches have any light to throw on such questions as why valency is variable, and whether or not valency is derived from the body of the atom.

It seems likely that the quantitative, as it were, standard valency usually associated with the vertical columns of the periodic table, may be that most easily expressed through the geometrical forms associated with those columns, as is indicated by the fact of this standard valency being just double the number of cones in most of the atoms of the columns containing calcium, boron, carbon, nitrogen and oxygen, and by the maximum valency of iron (seven) being half the number of bars (fourteen) characteristic of its group. But the examples of deviation from such a rule, *e.g.* calcium carbide (*Occult Chemistry*, p. 273), as well as the very definitely indicated multiple valency shown by hydrogen in acetylene suggest there is some other factor capable of over-riding the limitations of the *standard valency*, either by using a less value or transcending it and creating additional forms through which to act.

In answer to the question as to whether it is possible to bring forward any suggestion which will account at once

*Chapter contributed by Gerard Reilly.

for the properties of the elements and for this mystery of valency, one may propose the hypothesis that the real chemical entities are not some 92 elements whose identities and properties are revealed to us in, and are dependent upon, the 92 types of material particles which have been classified by chemical writers into the nine columns or classes of the periodic table of Mendeleeff, but certain streams or manifestations of "life" which manifest through *groups* of these forms and endow the members of these groups with properties that are similar. Science has classified the 92 elements into a table of ten or eleven horizontal lines and nine vertical columns, which latter contain elements of similar properties. Occult chemistry finds the forms of the atoms in the vertical columns to be of similar geometrical shape. Seven different shapes are described, some of which are duplicated to fill out the nine columns. Thus the hypothesis suggests that a single column of the periodic table contains the several chemical elements through which a single "life-element" manifests, and that (conversely) this one "life-element" ensouls all the chemical elements in the one vertical column of the table which are of the same occult form.

There is an analogy between the anu and the organic cell. Just as function, an expression of life, exists before the organ through which it expresses itself, and actually builds the organ out of the material at hand—the undifferentiated cells—so chemical properties, including valency, exist in the "life-elements" before the chemical atoms, and build the available material—the anu—into the specialised forms we are now studying, the chemical elements of the periodic table.

It has been shown that the hydrogen in acetylene has been disintegrated, as when raised to the ether 2 level, the integrity of the form being almost entirely shattered in order to satisfy the valency demands of carbon. Yet we have no difficulty in accepting this changed form as hydrogen, and assuming that if liberated from the grasp of carbon by burning it would reassume the double triangle form given in the illustration of water as its shape on the gaseous subplane. If the properties of hydrogen depend upon its form as a double, or as two single, triangles, or upon its being at the gaseous level, we must assume that these properties would be different when the triangles are

broken up, and the substance raised to the etheric level. And if there is nothing behind the form which is independent of form and subplane, why should the dismembered substance rebecome the hydrogen of chemistry? Why should the divided members of the atoms take up again their original forms (as steam condenses to water when the force that made it steam no longer acts upon it) unless it is due to this life, this noumenon behind the form?* The phenomenon observed in crystals of their variability within rigidly fixed limits points to a similar or parallel conclusion.

The hypothesis gains some support, also, from the behaviour of sodium and chlorine when combined. The compound, sodium chloride, is made up of two atoms of the same form (the dumb-bell), but placed in different columns of the periodic table. (*Occult Chemistry*, p. 270). Both are powerful elements, and of opposite polarity. Their strong affinity is indicated by the fact that they mutually break up each other's forms and share their anu in building a cubical form totally different from their own. What can make these disrupted atoms resume their original forms and with them their chemical identity and properties unless there is an unchanged life identity behind the forms? (For sodium chloride is very different from either of its constituents in its properties).

It would thus seem that the real basis of valency is to be found in the life, and it is not entirely dominated by the typical forms of the chemical atoms as described, but is able to transcend the limitations of these forms and remould them into fresh shapes capable of expressing other values than the standard valency. To do this the chemical element is sometimes raised from the gaseous subplane to the ether 2 level, and it would appear that in such a subtle state of existence the life has more freedom and power over its forms to express itself.

It should be added that where the term "life" has been used in this chapter, this does not mean LIFE *in the ordinary biological sense, but rather the* CREATIVE URGE *underlying all manifestation.*

*Mr. C. Jinarajadasa, in a personal comment on this, states that it is the will of the Third Logos which ensouls hydrogen to be hydrogen. Push the Will back one stage temporarily, as when the Second Logos comes into a combination, and the form breaks up. When that work is done the Third resumes control for normalcy.

Chapter VII

THE COMBINATION OF ATOMS

The study of statements and drawings made by occult observers, in which the combinations of 16 chemical elements into 48 compounds are described, shows that when the occultists' chemical atoms combine to form compounds they are often, though not always, broken apart in the process.

Several sorts of disintegrative changes in their forms take place, from the case of no change other than a distortion, or bending of the shape—the compounds being apparently merely the result of juxtaposition—through the cases wherein the atoms are split in halves or quarters, cases wherein the atoms are disintegrated into the structures which they assume on the lowest etheric subplane (ether 4) to the cases where hydrogen is broken up into bodies of 3 anu, as when it is raised to the ether 2 level, and finally the case illustrated by sodium chloride, where the disruption is extreme and some of the reassembled parts appear to contain anu from both constituent atoms. Moreover it must be assumed that, however much an atom may have been disrupted, and dispersed, or disintegrated, as on the higher etheric levels, it reassumes its ordinary shape, and its chemical identity and properties, when released from the compound in which it was broken up, and either set free or recombined in another compound.

The additional material published in the new edition of *Occult Chemistry* makes generalisation more rather than less difficult. However, the following "rules" seem to emerge concerning the extent of intratomic disintegration occurring on combination.

1. Oxygen always retains its integrity, suffering at most some compression or distortion.
2. Hydrogen nearly always breaks up into the two separate triangles (as at the E4 level), but sometimes, as in acetylene, benzene and nitrates, it breaks up into the six separate bodies it assumes on raising to the E2 level.

3. Carbon usually breaks into halves or quarters, but remains intact in aliphatic chains.

4. Nitrogen is greatly disintegrated in the compounds examined, except in ammonia and amides.

5. Metals are unaffected or only slightly distorted in their oxides and hydroxides. In their salts however, they are usually greatly disintegrated or distorted, though this is less evident with iron and antimony. Exceptions are sodium carbonate and magnesium chloride, where the metal atoms are hardly altered. Sodium and magnesium chlorides present a complete contrast between utter disintegration and no change in the metal atom. Conversely in the carbonates, sodium is not changed while calcium (in the same group as magnesium) is disintegrated. Moreover, and surprisingly, disintegration is seen to proceed even further in the crystalline forms of $CaCO_3$ than in the amorphous substance. It should be mentioned that there are many exceptions to the rules of orthodox chemistry also.

6. Other elements (N,S,P,Cl,Br.) are disintegrated or badly distorted when present in acid radicles.

The "rules" of interatomic linking follow naturally from the above.

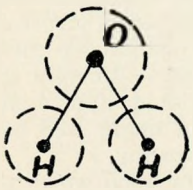
1. When one or more atoms remain intact, the other atoms or their constituent parts are usually arranged alongside or around to form the molecule. (*e.g.* aliphatic carbon compounds.)

2. Occasionally one atom is as it were threaded onto another (*e.g.* oxygen onto sodium in sodium hydroxide), or wrapped round another (*e.g.* hydrogen round oxygen in water), or inserted between constituent parts of another (*e.g.* oxygen between the centre and funnels of sulphur in sulphuric acid.)

3. When two or more atoms are disintegrated, their constituent parts are usually so completely mixed together as to be almost indistinguishable (*e.g.* sodium chloride and other salts.)

Orthodox scientific views as to the structures of compounds stand in rather sharp contrast to those of the occult investigators. The orthodox chemist regards the atom as a more or less nebulous body with its mass concentrated into a small central nucleus, but its chemical properties controlled principally by the number of electrons in the peripheral orbits. On the other hand, we have seen that clairvoyant investigations show the anu, and therefore, presumably, the mass, to be distributed throughout an O.C.A., instead of being mainly at the centre, although the anu are indeed concentrated in certain directions (along the cones, etc.).

It is generally held by orthodox scientists that on combination atoms do not approach closely to one another, certainly no closer than suffices for the blending of their respective outermost electron rings. Thus the compound water has been represented by this diagram. The conception of valency bonds between the nuclei of the combining atoms has then a definite meaning. In the simpler cases it is claimed that the distances between the components atoms, the angle between the bonds, the strengths of the links, and their electric moment, and characteristic vibration frequencies, can be deduced from infra-red and Raman spectra, X-ray and electron-ray interference, and dielectric constants. Thus the H and O atoms in water are alleged to be 0·107 mμ apart and the angle between the bonds is 64°. We thus see that only compounds of our first interatomic type conform with the orthodox conception. Such compounds, in which the atoms are in juxtaposition, do no violence to the idea of valency bonds, which can readily be imagined as the unseen forces holding the atoms in combination in the molecule. The behaviour of the compounds of the second or third types, in which complete enwrapping or blending of the atoms occurs, is seen by clairvoyants to be quite contrary to any orthodox theory of combination. Science has no conception of the possibility of atoms spontaneously disintegrating prior to combination, or of atoms arranging themselves concentrically. As explained elsewhere reconciliation



of orthodox and occult views is not assisted by assuming that the O.C.A. is the nucleus of the S.C.A.

How, then, can these discrepancies be explained? Even if one accepts the idea put forward earlier in this transaction, to the effect that the occultist deals mainly with the etheric content of the ATOM, and the physicist mainly with its dense physical part, then it is surely stretching this idea too far to suggest that the etheric content may be subdivided into a number of pieces within a compound, while at the same time it retains its dense physical unity as demanded by the scientists? No other possible explanation occurs to us, except the last and obvious one—either the scientists or the occultists have made wrong deductions from their observations.

The scientific theories are supported by data derived from researches in which various different techniques have been employed. It must not be forgotten, however, that alternative theories might be propounded which would fit most of the data equally well. It certainly seems surprising for example, that combination of the inflammable metal sodium with the toxic gas chlorine to yield so different and harmless a substance as common salt, should involve only the transfer of one electron; the layman might well consider the clairvoyant picture more convincing.

We must carefully re-examine the data upon which the orthodox view is founded, in order to discover whether the occult structures would fit the facts as well as, or better then, the commonly accepted ones.

Chapter VIII

CARBON COMPOUNDS

It has been already noted in the first chapter that the methods of science are better suited to the elucidation of the structures of compounds than of the internal structures of atoms.

Since the technique of occult investigation is also probably more easy in this field, it is not surprising to find the best agreement between occult and orthodox chemistry in the realm of compounds, and especially organic compounds. Nevertheless, even among these carbon compounds the agreement is not perfect, and we have thought it valuable to study closely the occult structures, in the hope that they might be found to explain the known reactions and characters of the compounds better than do the orthodox structures. In addition, such study was expected to throw further light on the problem of the nature of valency.

It has been noted in Chapter VII that the clairvoyantly observed structures of compounds, while confirming orthodox views on valency in respect of the number of atoms of each element in the compound, often show no trace of the orthodoc valency bonds linking the atoms. The carbon compounds, which in orthodox chemistry best exemplify this doctrine of valency bonds, are also exceptional among the compounds observed clairvoyantly, in that the constituent atoms are usually in juxtaposition and not fused or interlocked, so that some physical meaning may be assigned to the idea of links radiating in definite directions from the carbon atom, joining it to other atoms.

It is well known that the carbon atom is ordinarily held, on extremely good evidence, to have a tetrahedral structure, the four valencies being directed from the centre towards the corners. Yet the clairvoyant investigations reveal carbon as an octahedron; there are eight cones opening on to the eight faces of an octahedron; these are

alternatively positive and negative, and are linked in pairs, each pair having a single anu at the apices of the two cones. The occultists' carbon atom appears, therefore, to have four positive and four negative valencies or half-valencies, as postulated by the electronic theory, but they are directed from the centre, to the centres of the faces of an octahedron, instead of in pairs from the centre to the corners of a tetrahedron.

It does not seem possible to deduce from *Occult Chemistry* exactly how the eight cones are paired off, and this uncertainty permits several possible alternative structures for methane derivatives. There is not space in this transaction to record the details of this study, but the conclusion is definite and can be stated briefly. Not one of the possible structures fits the observed data of organic chemistry so well as the more simple and universally accepted tetrahedral carbon atom.

Structural organic chemistry has been built up very largely by observing the number of isomers possible with a given type of compound. (See any good text book on organic chemistry.) When, however, this well-tried technique is applied to any of the alternatives for the occult methane molecule, it fails to predict the number of isomers which have in fact been observed for the various types of derivative. Most of the occult structures demand, for example, two isomeric dichlormethanes, whereas only one is known; also they fail to account satisfactorily for the phenomenon of stereoisomerism.

The Carbon to Carbon Link

There are three hydrocarbons, each giving rise to a series of derivatives, in which two carbon atoms are linked together. These, with their orthodox formulae, are ethane $H_3C—CH_3$, ethylene $H_2C=CH_2$, and acetylene $HC\equiv CH$. Two tetrahedral carbon atoms are supposed to be linked in these compounds, by the juxtaposition of an apex of each, an edge of each, and a face of each, respectively. These structures fit well most of the experimental data, the derivatives being assumed, of course, to display the same carbon to carbon link.

Although ethane itself has not been examined clairvoyantly, the published structures for ethyl alcohol and

acetic acid justify assigning a similar structure to the parent hydrocarbon. It must consist of two carbon octahedra with an edge of each in juxtaposition, linked by two half valencies. This double linkage is reminiscent of that usually assigned to ethylene. It appears to deny the possibility of free rotation without strain about the C—C bond, which, in fact, would explain better than does the orthodox structure, certain isolated cases of isomerism, *e.g.* that of the malic acids; at the same time, however, many unobserved isomers should theoretically be possible if this occult structure is correct. In addition, the configuration of this ethane molecule is such that even monosubstitution products such as ethyl alcohol should exist in two separable forms; if this were, in fact, the case, separation would almost certainly have been observed during the large-scale fractionation of alcohol, which is daily carried out in distilleries.

Similarly, although ethylene itself has not been examined clairvoyantly, its structure can be assigned by analogy with that of maleic acid which also contains the C=C double bond. As might be expected, the occult structure shows two carbon octahedra placed apex to apex, so that four half-valencies of each can be linked. Such a structure would behave precisely like the orthodox ethylene structure, and would give rise, for example, to the cis-trans type of isomerism characteristic of certain ethylene derivatives.

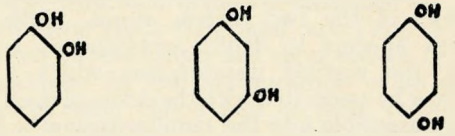
Acetylene has been examined clairvoyantly. It shows no triple linkage, which indeed would be difficult to imagine between the octahedral carbon atoms (involving union by six half-valencies). Instead, the hydrogen is disintegrated into the bodies of three anu each (formed on raising hydrogen to the ether 2 level), the twelve of which, derived from two hydrogen atoms, suffice to satisfy the twelve available half-valencies of the two carbon atoms. Although this arrangement appears to depict acetylene as a saturated compound, the marked unsaturation which it actually possesses may be associated with the desire of these hydrogen bodies to re-assemble into the familiar triangles; it may be noted, however, that these same hydrogen bodies are present in benzene, which is not highly unsaturated. Since other atoms have not been observed to break up after the manner of hydrogen, the acetylene derivatives are not likely to

have the same structure as the parent hydrocarbon. The unsaturation of such compounds is probably due not to anything analogous to the triple linkage of orthodox organic chemistry, but to free uncombined valencies of the carbon, though a double linkage of the type suggested for ethylene might be assumed (such a structure has been postulated by Nef in place of the commonly accepted triple bond, which does not well explain some of the properties of acetylene derivatives).

Benzene

Benzene has always been somewhat of a puzzle to the organic chemist, but they have generally agreed that it has a hexagonal structure. Collie has indeed depicted it as an octahedron, but in dynamic equilibrium with the Kekulé and centric formulae, and not as a permanent static structure. Certainly none of them, even in his wildest moments, would have imagined the structure seen by clairvoyant sight. The carbon atoms in the occultists' benzene molecule are divided so that a quarter of each of the six atoms, *i.e.* the contents of twelve cones, amalgamates into a dodecahedral figure at the centre of the molecule, while the remainders of the carbon atoms arrange themselves at the corners of an octahedron; each corner thus has 6 carbon cones and at the mouth of each there floats one of the bodies of three anu from hydrogen (*cf.* acetylene).

The orthodox hexagonal structure for benzene (or at least for its derivatives) has been deduced as the only structure which explains perfectly the number of isomeric di-, tri-, and tetra- derivatives which have been observed. Thus, for example, there are three isomeric dihydroxy- or dichlorbenzenes, the ortho, meta and para compounds:—



The octahedral structure would only be expected to provide two such isomeric di-derivatives. It may be noted that the six cones at each corner of the benzene octahedron

are arranged fan-wise. Unless the "fans" are revolving, they cannot all present the same aspect towards their neighbours, so this phenomenon provides another possible kind of asymmetry. However, none of the possible combinations is capable of accounting for the exact number of di- and tri- derivatives which benzene yields.

Benzene derivatives might therefore be expected to show different occult structures from the parent hydrocarbon. This is not the case however, with the few compounds that have been examined clairvoyantly. In phenol for example, the OH group replacing the six hydrogen bodies spreads across the fan of six carbon cones with little regard for formal valency links. In hydroquinone (para dihydroxy benzene) two OH groups are similarly arranged,* and they occupy as expected, opposite positions. Unfortunately the corresponding ortho and meta compounds were not examined, so it remains impossible to explain how the observed isomerism among benzene derivatives can be reconciled with the octahedral structure.

Naphthalene

The case of naphthalene is similar. The occult structure shows two octahedra fused together, in place of two hexagons similarly fused. The occult structure would yield two different monoderivatives as required, and indeed the isomeric α and β naphthols have been examined clairvoyantly. They differ in the expected fashion, but they should yield respectively 5 and 4 isomeric di-hydroxynaphthalenes, whereas the orthodox structure agrees with the facts in predicting 7 isomeric di-hydroxynaphthalenes derived from each of the naphthols.

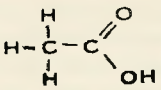
Alcohols, Acids, etc.

The structures of the alcohols call for little comment, except that the clairvoyant investigators observed that the hydrogen of the—OH, equally with the oxygen, was attached to the carbon; the "hydroxyl ion," an oxygen

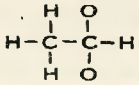
*As in phenol, the OH groups must displace hydrogen: the diagram in *Occult Chemistry* is evidently incorrect in showing these two hydrogens still present.

spiral with hydrogen triangle at each end, was seen floating bodily at the mouths of a pair of carbon cones.

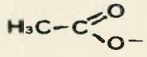
Acetic acid presents an interesting study. Judging by the orthodox structural formula for this substance:—



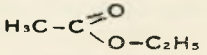
one might expect it to combine the properties of a ketone (characterised by the C=O group) and an alcohol. Actually it is unlike either, but has unique properties not well illustrated by this formula. The arrangement observed clairvoyantly would be better represented by the formula:—



Such a structure commits the heresy of showing oxygen as monovalent, but it does provide an unique formulation for the carboxyl group; the hydrogen atom placed between two oxygens is unstable, being attracted towards both, and therefore likely to be readily replaced by metals to form salts, such as sodium acetate. On the other hand, the esters of acetic acid, despite their dissimilarity to the salts, are normally represented as being formed exactly like the latter by replacement of the hydroxylic hydrogen by an alkyl group, *e.g.*



SODIUM ACETATE



ETHYL ACETATE

The occult formula precludes the possibility of esters being formed in this way, since, if they were, then, for example, ethyl acetate would be indistinguishable from methyl propionate. It seems fairly certain that the alkyl group in esters must be attached via oxygen somewhat as in the orthodox formula. Thus the occult acetic acid structure explains better than the orthodox one the unique properties

of the carboxyl group, and the difference between salts and esters. However it seems unsafe to generalise, because a totally different structure for the carboxyl group is shown in the diagrams for tartaric and maleic acids, and still another for salicylic acid.

Thus it is seen that among the compounds of carbon agreement between occult and orthodox views is closer than in most other branches of chemistry, though even here significant differences are noted. In some few cases the occult structures seem better suited than the orthodox to explain the facts of organic chemistry, but in others there is difficulty in reconciling the occult structures with the available data.

Chapter IX

THE FUTURE OF OCCULT CHEMISTRY

We believe that in the years to come a new chemistry will arise, built up on a twofold foundation; the clairvoyant technique will then be accepted as a valid and valuable tool, and will be used alongside other methods of research, because in time the inevitable limitations of the latter will be seen, and a new instrument in the search for truth will be welcomed. In the light of this belief we have made this preliminary survey of some aspects of *Occult Chemistry*, in order to gain some appreciation of its methods and the significance of its data. We have tried, not only to interpret and clarify some of the ideas presented, but where possible to relate them to currently accepted views, in the hope of stimulating, and clearing the ground for, further work in this field.

Our brief comparison of the occult and orthodox theories of atomic structure, clearly reveals one fact at least—that much work remains to be done before the rapprochement which we believe to be eventually inevitable, is actually realised. This work needs to proceed along three lines:—

(a) pursuance of orthodox scientific research;
(b) pursuance of the clairvoyant investigations;
(c) in both fields, search for alternative and truer interpretations of available data, such work to be inspired by thorough familiarity with the relevant data presented by *both* schools.

Here, then, is important work waiting to be done by scientists, clairvoyants and philosophers alike. In the first direction, research will proceed without the need for any stimulus which we might be able to give. In the second, that of clairvoyant investigation, those who have done all the work so far accomplished are no longer with us, and we do earnestly appeal to any who have, or believe they could develop, the requisite faculties, to turn their

attention to this subject. Confident that this urgent appeal will not be disregarded, we append a list of the investigations which we consider the most vital to the further advancement of these researches.

Most of us, however, have neither elaborate laboratories nor clairvoyant faculties, yet there is no need for anyone who is keen to despair of being able to help. The third line of work, the search among the great mass of facts for truth, for underlying principles which shall reveal to us more fully the beauty of the Great Plan,—this after all is the hardest task, and the finest task, yet it needs no equipment but a keen mind, tuned by hard study and patient thought, to receive the inspirations which will surely come to the truly earnest student, whose life is dedicated to this service.

We want Truth by whomsoever it is presented. We want to understand the full glory of the Plan as it applies to matter. Towards this understanding both scientists and occultists have contributed a great deal; let us not underrate the achievements of either school, but be equally willing to learn from both. We have to develop the ability to pick out from among the mass of irrelevant detail the key facts, which fitting in with others, reveal further glimpses of the scheme of things.

In this task we shall need courage, based on a clear understanding of the methods we have a right to use, and a determination to follow them relentlessly. The attitude to both orthodox and clairvoyant research should be the same; where there is internal evidence of careful and accurate work, it may be taken that the *results* obtained in both fields are substantially correct; the *interpretations* of the results, however, we must learn to esteem much less highly than is our wont. We must remember that because a theory fits the known facts, it is by no means necessarily true. Sometimes a number of equally satisfactory theories might be proposed, but it is natural always to choose the *simplest* theory which is adequate to explain the experimental results, and then often the alternatives are forgotten, and the chosen theory rapidly becomes a dogma. We must not be surprised if the vast new body of facts revealed in *Occult Chemistry* and other Theosophical text-

books are found on analysis to disprove a number of accepted theories.

We must not be attached to theories, but recognise them for what they are,—temporary hypothetical explanations, of value as syntheses of past work and stimuli to future work. Any attempt to reconcile these new *facts* with current scientific *theories* is unsound in principle and almost certainly will lead to disappointment and failure. Our task is the more fundamental one of correlating the new *facts* with the old *facts*, and building new and better theories on the twofold foundation. We must put ourselves mentally in the position of those who carried out the fundamental researches upon which modern theories were based; if they had known also of the clairvoyant researches, how would this have affected the theories they proposed?

Suggested Clairvoyant Investigations

Size of Particles. In Occult Chemistry the relative sizes of the particles described are in most cases not mentioned at all; one or two dimensions are given in passing, but only qualitatively. The measurement of such particles is an obviously useful addition to the work, which would greatly enhance its scientific merits. In addition, some of the figures could be checked against values determined by orthodox methods, while, in other cases, the sizes would afford a valuable clue as to the identity or otherwise of particles studied by occult and by orthodox science.

We should like to know the approximate *diameter* of:—

(1) the anu;

(2) the components of the atom of some particular element, *e.g.* in sodium the size of the cones, connecting rod, globes, and the groupings of anu inside these cones, etc.;

(3) atoms of a few typical elements;

(4) molecules of compounds containing these elements.

Also the *distances apart* of:—

(1) anu in one of the simpler elements, *e.g.* hydrogen;

(2) atoms or molecules in liquids and crystals, *e.g.* of water molecules in liquid water, and the carbon atoms in graphite and diamond.

We realise that such dimensions cannot be measured with a foot rule. It does seem feasible, however, to use one or other of these dimensions themselves as a standard. For example, the diameter of the anu might conceivably serve as a yard stick, or better, the *distance between carbon atoms in diamond*, since this value is known in orthodox science.

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